Faserverbund- und Stahl-Standard-Verbindung
The missing link
The missing link – Aim of FAUSST

A standardised, class approved, joining method between metals (steel) and fibre reinforced materials (GFRP)

- Textile based transition joint as a half-finished product
- No additional adhesive
- No special processes on the yard; just weld
Process chain

Production FAUSST semi-finished product

Knitting hybrid fabric

Steel connector design

Joining of hybrid fabric and flat steel

Integration into FRP structure

Implementation FAUSST semi-finished product

Joining FRP structure to steel structure

FAUSST Fabric

Other Fabric
Process chain

Knitting hybrid fabric

Production FAUSST semi-finished product

Steel connector design

Joining of hybrid fabric and flat steel

Integration into FRP structure

Implementation FAUSST semi-finished product

Joining FRP structure to steel structure
Production

Stitch thread

Source: Fa. Groz-Beckert

Pillar stitch
Alternatives: Tricot, Satin…
Weft Inlay

Two load transfer mechanism:
- Fibre friction
- Mechanical locking
FAUSST Knitted fabric

- Steel – Glass fibre knitted hybrid transition fabric

- Design in close cooperation with Fritz Moll Textilwerke GmbH &Co.KG. Second design loop in process.
Process chain

- Knitting hybrid fabric
- Steel connector design
- Joining of hybrid fabric and flat steel
- Integration into FRP structure
- Joining FRP structure to steel structure
Geometries of the FAUSST connector

Different geometries possible….

Monolithic Laminate

Monolithic Laminate

Sandwich construction
Process chain

Production FAUSST semi-finished product

- Knitting hybrid fabric
- Steel connector design

Integration into FRP structure

Implementation FAUSST semi-finished product

- Joining of hybrid fabric and flat steel

- Joining FRP structure to steel structure
Resistance seam welding
Test results: Half-finished product

FAUSST Fabric

Weld joint

Steel connector
Process chain

Production FAUSST semi-finished product

Knitting hybrid fabric

Steel connector design

Joining of hybrid fabric and flat steel

Integration into FRP structure

Implementation FAUSST semi-finished product

Joining FRP structure to steel structure
Standard Process
FRP Structure with Steel frame

Manufacturing supported by...
Process chain

1. Knitting hybrid fabric
2. Steel connector design
3. Joining of hybrid fabric and flat steel
4. Integration into FRP structure
5. Joining FRP structure to steel structure
WIG Welding
Prototype

Composite Structure

FAUSST fabric (several layers)

Weld joint

FAUSST connector (steel)

Weld joint

Steel Structure
**Test results**

Specimen details:
4 FAUSST layers
20mm overlap

<table>
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<th>F_first [kN]</th>
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![Graph showing load vs. displacement]
Outlook

- Mechanical characterisation in progress
- Prototype demonstration in progress
  → Contact Us if interested!
- Second design loop of FAUSST fabric initiated
- Planning transition joint with other materials
Conclusion

- Development of a novel, patent pending, textile based, transition joint between steel structures and glass fibre structures
- Joining of dissimilar materials via standard processes
- Mechanical characterization still in progress, but competitive with adhesive joints.
- Discussion with class for way for approval
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Contacts and questions welcome at

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Thank you for your attention!